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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/665,346

09/22/2003

Yujin Yamazaki

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07/06/2006

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 07/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,346

Applicant(s)

YAMAZAKI ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on April 29, 2006, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 14 and 15.
- Claims 1-5 and 7-15 remain pending in this application.

Response to Amendment

1. The amendment filed **April 29, 2006** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claim 1 has been amended** to include the phrase "fixing material ... fixed to the first multi-layer film and the first surface, **claim 14 has been amended** to include the phrase "fixing said substrate via a portion of the surface to a fixing material" and **claim 15 has been amended** to include the phrase "said substrate is fixed via a portion of the first surface to a fixing material". The specification simply fails to disclose that the fixing material has made any contact with respect to the substrate. Please see Figures 7 and 12, none of these figures give positive support for the fixing material to be in contact with the first surface of the substrate.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3. **Claim 1-5 and 7-15 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added feature are set forth in the paragraph above.

4. **Claims 1-5 and 7-15 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification fails to teach how could the fixing material is capable of being fixed to both the multi-layer film and the first surface of the substrate as recited in amended claim 1.

The specification also fails to teach how could the substrate being fixed to the fixing material via a portion of the first surface of the substrate. The specification teach that the fixing material is being fixed to the first multi-layer film not to the surface of the substrate.

Claim Objections

5. **Claims 1-5 and 7-15 are objected to because of the following informalities:**

(1) **Claim 1 has been amended** to include the phrase “fixing material ... fixed to the first multi-layer film and the first surface” that is confusing and indefinite since this phrase suggests that the fixing material is between the first multi-layer film and the first surface of the substrate which is not possible.

(2). Claims 14 and 15 have been amended to include the phrase “fixing ... substrate view a portion of the first surface” and the “first multi-layer film on a portion of the first surface” that are confusing and indefinite since it is not clear if these portions are the same or not. If they are the same

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what is the structural order between the multi-layer film and the fixing material and if they are not, what are the structural relationship between the two.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims, 1, 5 and 7-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki (PN. 5,930,045) in view of the patents issued to Spiller et al (PN. 6134,049), and Okumura et al (PN. 5,969,902).**

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A)) and a *first reflecting film* (166) placed on a *first surface* of the substrate and a *second reflecting film* (168) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. This reference however does not teach *explicitly* that the first and second reflecting films of multi-layer film structure with plural films. However it is a rather standard knowledge in the art that reflective film can be formed by multi-layer structure with alternatively laminated high and low refractive index materials, (please see the explicitly demonstration of **Spiller et al** wherein the reflecting layer has multi-layer structure of alternatively arranged high and low refractive index materials, Figure 1). Such modification would then have been obvious to one skilled in the art for the benefit of using the multi-layer structure to design reflective layers having desired reflection characteristics.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the VIPA has a *stress correction film* formed on the *second multi-layer film*, (with regard to newly amended claims 1, 14 and 15). **Spiller et al** in the same field of endeavor teaches to compensate or reduce stress of a multi-layer film by placing on *top* the multi-layer film a film (13, Figure 1) having a stress value that would balance the stress value of the multi-layer film (12) so that a *net stress* may assume value zero, (please see Figures 1 and 2). It would then have been obvious to apply the teachings of **Spiller et al** to add a stress correction layer on top of the multi-layer film of the VIPA for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film is provided to correct the stress imposed by both reflecting films on the both sides of the substrate, such feature is implicitly included since for the VIPA having the pair of reflecting films, the stress is contributed from both reflecting films and the stress value of the correction film must be selected to compensate the net stress value contributed from both reflecting films.

Claims 1, 14 and 15 have been amended to include the phrase “the first surface of the substrate is opposite the second surface of the substrate”. **Shirasaki** teaches *the first reflecting film* (166) is placed on a *first surface* of the substrate and *the second reflecting film* (168) placed on a *second surface* of the substrate, and the first and second surface of the substrate are opposite to each other.

With regard to claim 5, Shirasaki teaches that the VIPA (240, Figures 17-20) may be utilized with a mirror (254) to realize a dispersion compensator.

With regard to the feature concerning the substrate is fixed to a fixing layer having the same thermal expansion coefficient as the substrate, it is not clear what is the logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be

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positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* to certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion. It would then have been obvious to one skilled in the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by **Okumura** et al to make the disk substrate *support member* and the disk *substrate* with the materials having the *same* thermal expansion coefficient, (column 10, lines 59-68) to prevent distortion to the substrate when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter.

Claims 1, 14 and 15 have been amended to include the feature that the fixing material is fixed to the first surface of the substrate or the substrate is fixed to the fixing material via a portion of the first surface. These feature are not supported by the disclosure of the specification, since if it is the case, the fixing material has to be between the first multi-layer film and the substrate (for claim 1) which will destroy the filter. One skilled in the art would know that if the substrate is large enough, one can of course make the holder to hold the substrate via a portion of its surface.

With regard to claims 7-13, although these references do not teach that the holder or the fixing material is made of the various materials claimed, such modifications would have been obvious to one skilled in the art to select desired materials having the same thermal expansion coefficient as the holder for the VIPA for the benefit of using a variety of alternative materials as the materials for making the holder that fixes the substrate of the VIPA and at the same time not cause distortion to the substrate. The fixing to the protector plate may be considered as optically jointed.

8. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Shirasaki (PN. 5,930,045) in view of the patents issued to Fujii et al (PN. 5,424,876) and Okumura et al (PN. 5,969,902).

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A)) and a *first reflecting film* (166) placed on a *first surface* of the substrate and a *second reflecting film* (168) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. This reference however does not teach *explicitly* that the first and second reflecting films of multi-layer film structure with plural films. However it is a rather standard knowledge in the art that reflective film can be formed by multi-layer structure with plural layers of different refractive index materials. Fujii in the same field of endeavor teaches a reflective film that is comprised of plural layers of different refractive index. It would then have been obvious to one skilled in the art to modify the reflective layer of Shirasaki et al with plural layers of different refractive index materials for the benefit of using the multi-layer structure to design reflective layers having desired reflection characteristics.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the VIPA has a *stress correction film* formed on the second multi-layer film. Fujii in the same field of endeavor teaches to use a *silicon dioxide layer* in a *multi-layer mirror* such that the silicon dioxide layer imposes a compressive stress on the substrate of the multi-layer mirror such that the stress on the substrate resulted from all the other multi-layer films in the mirror may be reduced, (please see column 2, lines 1-49). It would then have been obvious to apply the teachings of Fujii to add a silicon dioxide layer to the VIPA as a stress correction layer for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film (i.e. the silicon dioxide film) is provided to correct the stress imposed by both

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reflecting films on the both sides of the substrate. Such modification would have been obvious to one skilled in the art since the thickness of the silicon dioxide as Fujii teaches explicitly (please see column 4, lines 3-8), is selected particularly to correct and compensate the *net stress* upon the substrate whether the stress is from one film on one side or films on the both sides. The stress on the substrate is a resultant *net stress* on the substrate and that resultant stress is being corrected by the silicon dioxide layer with selected thickness. With regard to claims 2-4, Fujii teaches that the stress correction film is a silicon dioxide film and its thickness may be adjusted to properly reduce the stress. The thickness of the silicon dioxide film is also selected so that it *does not affect* the optical property of the multi-layer mirror. It is a well-known knowledge in the art that in a multi-layer film structure, in order for the layer not to effect the optical property the layer should have an optical thickness of half or multiple of half of the specific wavelength of interest in order for the light effected by the layer be completely out of phase. Such modification therefore is considered obvious to one skilled in the art so that the silicon dioxide layer will not affect the reflectivity of the reflective layers (166 or 168). The optical flatness of the substrate being within one wavelength or less is rather standard in the art for the purpose of reducing unwanted scattering of the light at the surface.

Although this reference does not teach explicitly that the stress correction layer is placed on the multi-layer film, however since the net stress of the reflecting mirror is the vector sum of the stress contributed by the reflecting multi-layer and the correction film, to place the stress correction film either on the multi-layer film or under does not effect the purpose of reducing the stress. Such modification would then have been obvious to one skilled in the art for the benefit of designing the reflecting mirror as desired and to fit the particular application requirements.

Claim 1 has been amended to include the phrase “the first surface of the substrate is opposite the second surface of the substrate”. **Shirasaki** teaches *the first reflecting film* (166) is placed on a *first*

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surface of the substrate and *the second reflecting film* (168) placed on a *second surface* of the substrate, and the first and second surface of the substrate are opposite to each other.

With regard to the feature concerning the substrate being fixed to a fixing layer having the same thermal expansion coefficient as the substrate, it is not clear what is logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* to certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion. It would then have been obvious to one skilled in the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by **Okumura** et al to make the disk substrate *support member* and the disk *substrate* with the materials having the *same* thermal expansion coefficient, to prevent distortion to the substrate when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter.

Claim 1 has been amended to include the feature that the fixing material is fixed to the first surface of the substrate. This feature is not supported by the disclosure of the specification, since if it is the case, the fixing material has to be between the first multi-layer film and the substrate (for claim 1) which will destroy the filter.

Response to Arguments

9. Applicant's arguments filed April 29, 2006 have been fully considered but they are not persuasive. The newly amended claims have been fully addressed in the paragraphs above.

10. Applicant's arguments are mainly drawn to the newly amended features and newly added claims that they have been fully addressed in the paragraphs above.

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In response to applicant's arguments which state that the Spiller reference does not teach the substrate has a first and second surface that is opposite to each other, the examiner respectfully disagrees and wishes to point out that the substrate (11, Figures 1 and 2) explicitly has a first and second surface that are opposite to each other. Also forming the reflective layer by multiplayer structure really has nothing to do if the substrate has two surfaces opposite to each other or not.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

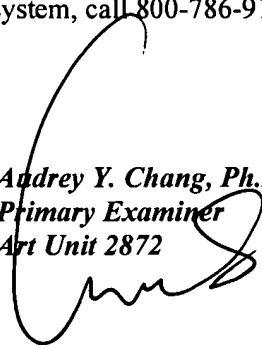
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.